

## **UPPER BASIN WATER CONNECTIONS IN THE DEVILS LAKE BASIN**

In the Devils Lake basin, which is officially classified as being a sub-basin of the Red River basin, there is geological and documented evidence of natural surface water connections between the Devils Lake basin, and sub-basins of the Red River basin. This brief report is not meant to be all-inclusive on the information regarding water connections in the upper basin of Devils Lake. It contains information regarding water transfer and potential for transfer of biota both north and south.

While the elevation of the southern divide of the Devils Lake basin is significantly higher than Devils Lake, at other locations in the basin, the divides are not readily obvious on the landscape. In fact, in various places on the northern and eastern sides of the Devils Lake basin, the divide is barely discernable. This has to do with our region's "young" topography, where drainages are not always well defined.

Because areas along these divides are relatively level, factors such as the intensity of precipitation, wind, and vegetation, can cause water to pool, and influence the flow from one basin to another. In reality, instead of being completely separate, basins in our region have a perforated barrier, which, under the certain conditions, allows water, and thus aquatic organisms to easily move across.

Numerous connections occur around the basin, including drainage on the south side of Devils Lake, Rock Lake on northern edge of the basin, and McHugh Slough area on the eastern side of the basin. Undoubtedly there are other, undocumented areas in the basin, where interbasin transfers occur.

### **Rock Lake**

Rock Lake is located in Towner County near the City of Rock Lake, ND, and is tributary to the Pembina River. There are numerous accounts of water flowing from Rock Lake (Pembina River basin) into the Mauvais Coulee (Devils Lake basin). The figure below shows two possible routes.

In 2004, a report was provided that that carp were observed in a flooded brome grass field near Rock Lake (T. 162 N., R. 66 W, Section 10). On July 22, 2004 a fisheries crew from the Game and Fish Department surveyed an area near Highway 5 east of Rock Lake (Sections 3 and 10). Both sides of the highway provided numerous young carp. Further investigations south of this area yielded no carp. Further southward movement was thought to be inhibited by heavy cattail growth in existing channels. Had the carp been able to go beyond the cattails they would have had free movement into Mauvais Coulee.

No surveys have occurred in this area during 2005. Surveys are scheduled to begin the week of July 25, 2005.

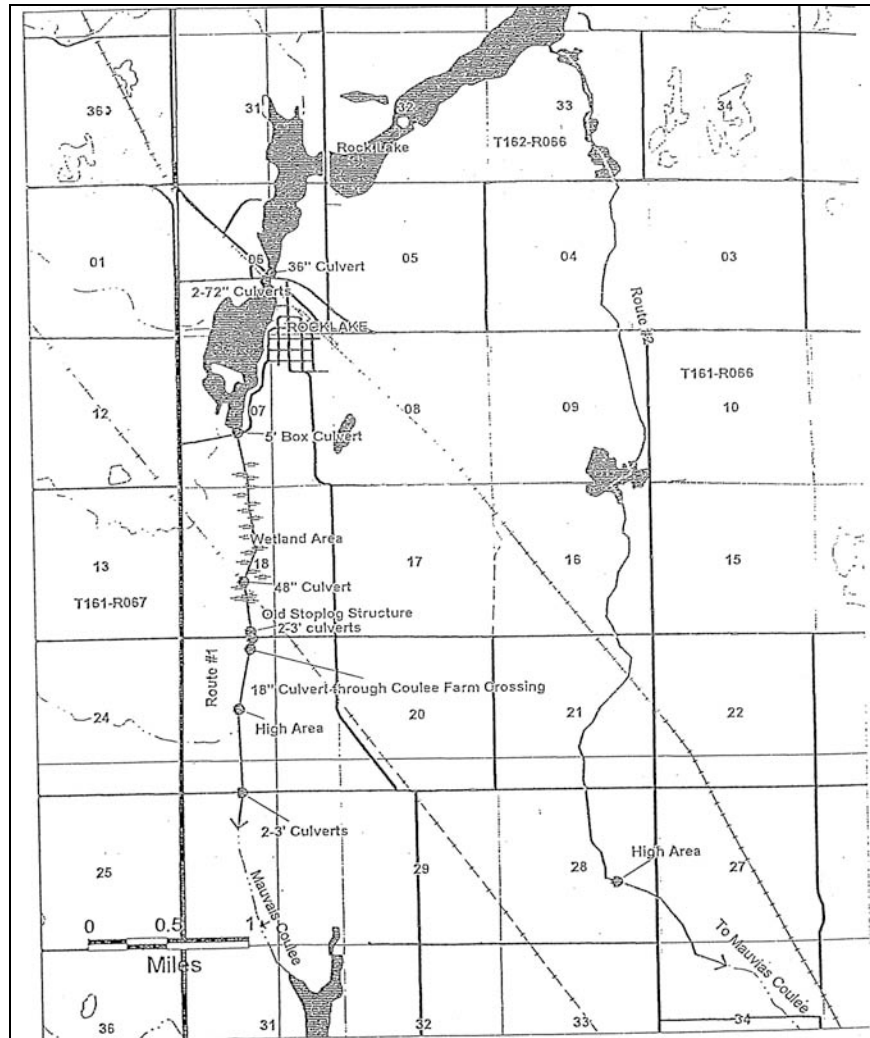


Figure 3. A map of the Rock Lake connection area. Rock Lake lies within the Pembina River basin, and the Mauvais Coulee flows into Devils Lake.

### **Billings Lake**

One of the best-documented interbasin connections occurs in the northeastern portion of the Devils Lake basin, in Cavalier County, at Billings Lake.

From communications with members of the Cavalier County Water Board, this connection has been common knowledge in their county for years, having occurred numerous other times in the last 15 years, so attributing the discovery is difficult.

This connection has been documented on at least four separate occasions at the southeast corner of Section 26, Township 160 North, Range 61, West of the 5<sup>th</sup> P.M. This location is approximately four miles west, and four miles north of Nekoma, ND.

The first documentation of a connection came from aerial color infrared photos taken in 1997 of water flowing across the divide.

In the spring of 2003 a Cavalier County Water Resource Board member took pictures of the connection occurring.

In April of 2004 the State Water Commission documented a water connection. At that time, approximately 15 cfs was flowing toward the north from the Devils Lake basin into the Pembina River basin. In October of 2004, State Water Commission staff investigating the site noted that water was still flowing north, albeit at a much lower rate. It is likely that water was flowing across the divide from April until at least October of 2004.

In 2005, Game and Fish personnel documented water flowing north from the Devils Lake basin, across the basin divide, into the Pembina River basin. In 2005, the State Water Commission in association with Game and Fish, installed staff gauges at the divide, to measure the flows. At the time of the preparation of this document, flow estimates were not yet available.

As water from Billings Lake flows into the Edmore Coulee, which flows into Devils Lake, it eventually will be Devils Lake. What this water provides, is a contiguous surface water pathway for biota to travel between Devils Lake and the Red River basin.

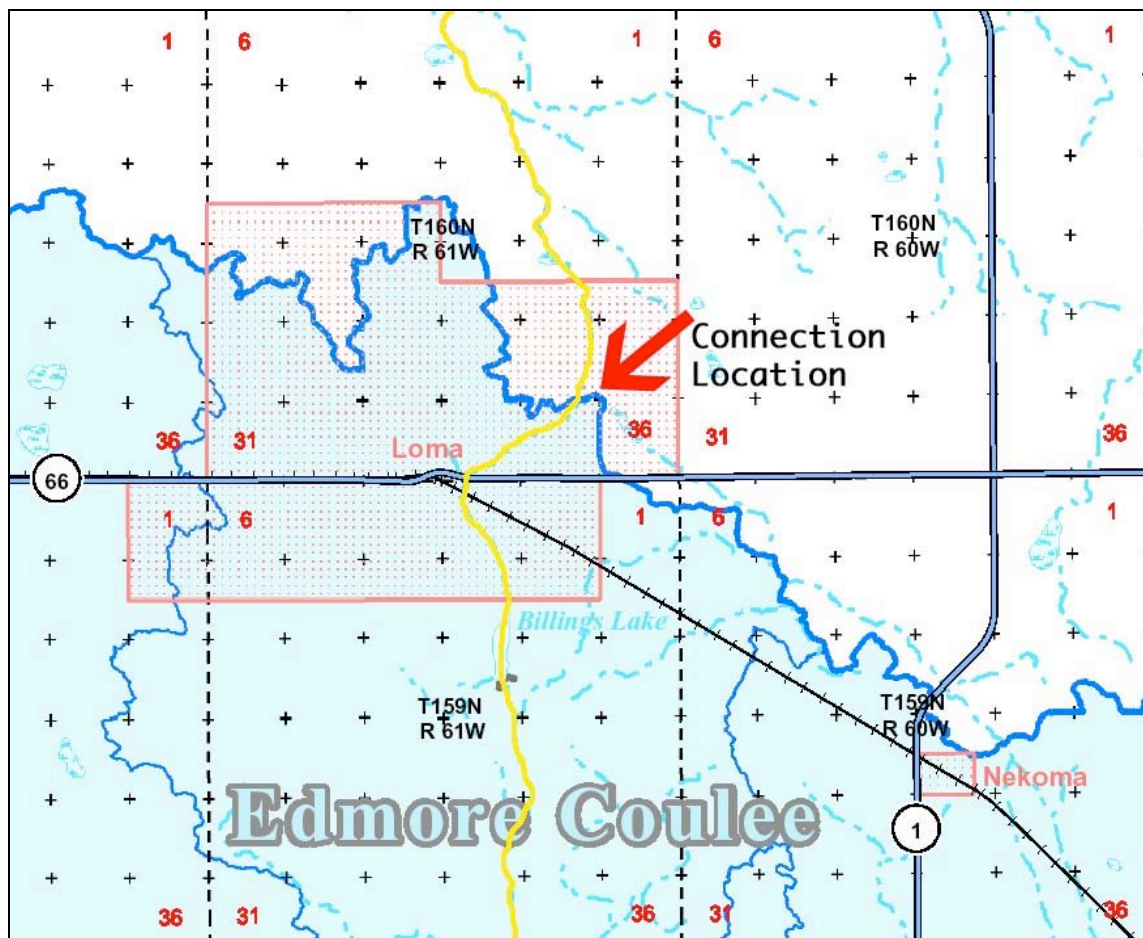


Figure 4. A map of the Billings Lake connection area. The yellow indicates where the water flows.

2004 Connection:

Picture 1: This picture is looking north from a 36" corrugated metal pipe located in the SE corner of section 26, Township 160, and Range 61. This area is located at the basin divide between the Devils Lake and Pembina River basins, approximately four miles west, and four miles north of Nekoma, in Cavalier County, North Dakota.



Picture 2: This picture is looking south from a 36" corrugated metal pipe located in the NE corner of section 35, Township 160, and Range 61. This area is located at the basin divide between the Devils Lake and Pembina River basins, approximately four miles west, and four miles north of Nekoma, in Cavalier County, North Dakota.



Picture 3: This picture is looking south from the NE corner of section 35, Township 160, and Range 61. This area is located at the basin divide between the Devils Lake and Pembina River basins, approximately four miles west, and four miles north of Nekoma, in Cavalier County, North Dakota.



Picture 4: This picture is looking south from east-west road in the NE corner of section 26, Township 160, and Range 61. This area is located approximately one mile north of the basin divide between the Devils Lake and Pembina River basins, approximately four miles west, and five miles north of Nekoma, in Cavalier County, North Dakota.



Picture 5: This picture is looking north from east-west road in the SE corner of section 23 Township 160, and Range 61. This area is located approximately two miles north of the basin divide between the Devils Lake and Pembina River basins, approximately four miles west, and six miles north of Nekoma, in Cavalier County, North Dakota.



#### 2003 Connection:

Picture 6: This picture is looking north from a 36" corrugated metal pipe located in the SE corner of section 26, Township 160, and Range 61. This area is located at the basin divide between the Devils Lake and Pembina River basins, approximately four miles west, and four miles north of Nekoma, in Cavalier County, North Dakota.



Picture 7: This picture is looking northwest from a 36" corrugated metal pipe located in the SE corner of section 26, Township 160, and Range 61. This area is located at the basin divide between the Devils Lake and Pembina River basins, approximately four miles west, and four miles north of Nekoma, in Cavalier County, North Dakota.



Picture 8 This picture is looking southwest from a 36" corrugated metal pipe located in the NE corner of section 35, Township 160, and Range 61. This area is located at the basin divide between the Devils Lake and Pembina River basins, approximately four miles west, and four miles north of Nekoma, in Cavalier County, North Dakota.



Picture 9: This picture is looking southwest from a 36" corrugated metal pipe located in the NE corner of section 35, Township 160, and Range 61. This area is located at the basin divide between the Devils Lake and Pembina River basins, approximately four miles west, and four miles north of Nekoma, in Cavalier County, North Dakota.



1997 Connection:

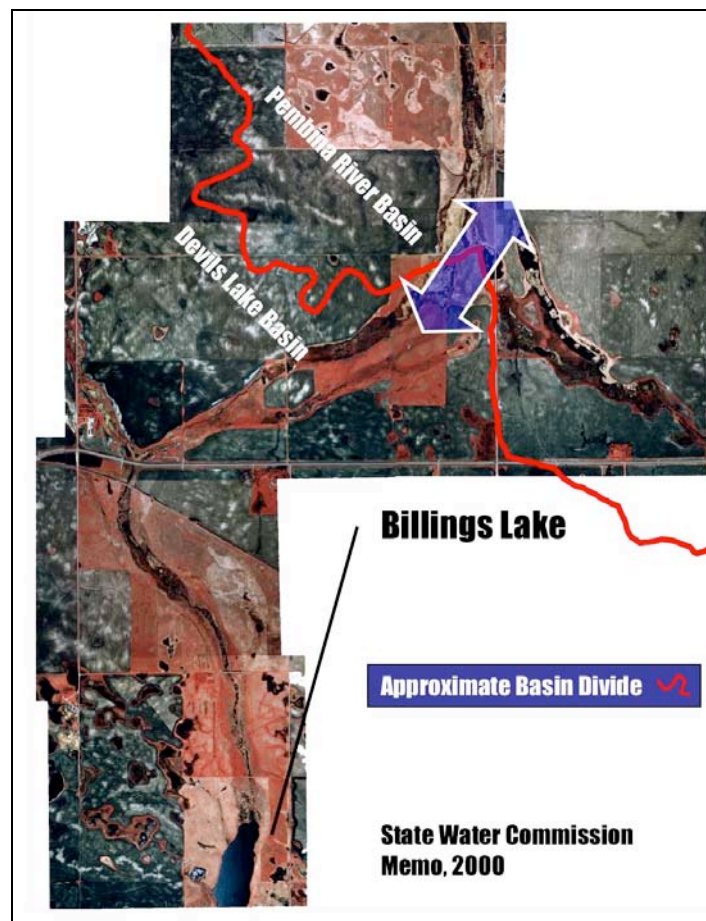


Figure 5. An aerial photograph of the Billings Lake divide area in 1997, showing water (in black) between the basin divide and Billings Lake.

The Billings Lake connection is of concern to Game and Fish, because spawning carp have the potential to move across the basin divide during their spawning migration, which could mean they would move into the Devils Lake basin. Compounding that fear, are recent records of carp just north of the basin divide.

The issues of water transfer between basins, and the potential for carp transfer was brought up to the Devils Lake Basin Joint Water Resources Board in October 2004 and tentative actions taken. Game and Fish staff have taken flow measurements at the divide, with water having flowed ‘both ways’ since spring runoff has occurred. On June 29, 2005 fisheries crews surveyed the area north of the divide and found young carp, which indicates the presence of sexually mature carp in the area.

There is a large cattail complex between the two sample sites which is providing an imperfect barrier for quick movement to the south. Billings Lake proper was surveyed with no carp documented thus far.

Water flow between the Rock Lake drainage and Devils Lake, and the Pembina River drainage and Devils Lake has undoubtedly occurred in the past few years. It appears that carp have not yet entered the Devils Lake drainage but with the flows that are present it’s entirely possible that they can enter as well as other organisms. This, of course, means that any biota can move both ways since the water is flowing both directions during any given high water year.

### **Additional Connections**

While Billings Lake and Rock Lake are the best-documented connections, there are others in the basin. In particular, Black Slough and McHugh Slough in the southeastern portions of the basin have the potential for interbasin transfer. At this time however, there is insufficient evidence to reach a conclusion about their connectivity.